

APPENDIX D

ENVIRONMENTAL NOISE ASSESSMENT

Dudek & Associates

La Costa Town Square Project Environmental Noise Assessment

May 19, 2008

Rock Crushing and Blasting Noise and Vibration Assessment

May 14, 2008

December 22, 2008

J.N. 5618-01

Ms. Brenda Tworoger
La Costa Town Center, LLC
C/O Aspen Properties
8799 Balboa Avenue, Suite 270
San Diego, CA 92123

SUBJECT: *La Costa Town Square Project*
Environmental Noise Assessment

Dear Ms. Tworoger:

This report contains our assessment of the noise associated with the La Costa Town Square project located in the City of Carlsbad. In summary, noise associated with loading dock and truck deliveries and the HVAC equipment could affect proposed residential areas. Various measures are identified in this report to mitigate these noise impacts to a level of less than significant.

Several of the single-family lots adjacent to Rancho Santa Fe Road would be subject to vehicular noise levels exceeding the City's 60 dB CNEL noise guideline. A noise barrier ranging from five to eight-feet in height along Rancho Santa Fe Road would mitigate the noise impact.

To comply with City's interior noise standard, an interior noise study will be required for the single-family homes located on Lots 34-48 if two story residences are located on these lots. The interior acoustical analysis will be required prior to issuance of building permits for these residences to ensure that the interior CNEL would not exceed 45 dB. The residences may require air-conditioning and/or mechanical ventilation to meet the City's interior noise standard. Sound-rated windows may also be required for some of these residences.

1.0 BACKGROUND

1.1 Project Setting

The project site is located at the northeast corner of the intersection of Rancho Santa Fe Road and La Costa Avenue in the City of Carlsbad (*Figures 1 and 2*). Noise sensitive receivers adjacent to the site include single and multi-family residences located south of the site across La Costa Avenue. Single-family homes are located on the west side of Rancho Santa Fe Road.

The project proposes to construct 284,400 square feet of commercial uses, 55,000 square feet of office uses, an outdoor gathering area as well as 64 single-family lots. Also, the project has an alternative to replace all 55,000 square feet of proposed office uses with multi-family units.

The primary existing noise source at the site is traffic noise along Rancho Santa Fe Road and La Costa Avenue. The existing traffic volume along Rancho Santa Fe Road is approximately 39,950 average daily traffic (ADT) adjacent to the site (Urban Systems Associates 2008). The existing traffic volume along La Costa Avenue east of Rancho Santa Fe Road to Calle Timiteo ranges up to approximately 5,700 ADT (Urban Systems Associates 2008).

1.2 City Noise Criteria

The City of Carlsbad's General Plan Noise Element presents community noise levels in terms of the community noise equivalent level (CNEL). CNEL is a 24-hour average equivalent A-weighted sound level with a ten decibel (dB) "penalty" added to noise during the hours of 10:00 p.m. to 7:00 a.m., and a five dB penalty added to the evening hours of 7:00 p.m. to 10:00 p.m. The five and ten dB penalties are applied to account for increased noise sensitivity during the evening and nighttime hours. Attachment 1 contains definitions of acoustical terms used in this report. All sound levels in this report are A-weighted.

The City has established noise guidelines in the Noise Element of the City's General Plan. These limits are applicable for transportation noise sources. Residential land uses are considered normally acceptable up to 60 dB CNEL. The City does not regulate by municipal code ordinance general nuisance noise such as that associated with mechanical equipment located on private property. Therefore, for the purposes of this analysis, mechanical equipment is also subject to the 60 dB CNEL noise criteria at noise sensitive land uses.

Interior noise levels at residential dwellings are not to exceed a CNEL of 45 dB. Office uses and commercial uses are not to exceed an hourly average noise level of 55 dB.

1.3 Methodology

Traffic noise has been assessed based on the City's noise assessment methodology documented in the City's Noise Guidelines Manual (City of Carlsbad, 1995). The future noise levels along Rancho Santa Fe Road and La Costa Avenue were determined using Caltrans' SOUND32 Highway Traffic Noise Prediction Model (Caltrans, 1983) with California noise emission factors (Caltrans, 1987). The noise model is based on the Federal Highway Administration's traffic noise prediction model (FHWA, 1978). Input used in the noise model included the future year 2030 traffic volume of up to 61,660 ADT along Rancho Santa Fe Road and 14,000 ADT along La Costa Avenue between Rancho Santa Fe Road and Calle Timiteo. Future vehicle speeds are assumed to be 55 mph along Rancho Santa Fe Road and 45 mph along La Costa Avenue. The truck mix used for Rancho Santa Fe Road was 3.52 percent medium trucks and 1.24 percent heavy trucks. The truck mix used for La Costa Avenue was 1.83 percent medium trucks and 0.28 percent heavy trucks. The traffic mix is based on vehicle mix surveys recommended by the City (City of Carlsbad 1995).

2.0 EXISTING CONDITIONS

2.1 Ambient Noise Monitoring

Noise measurements were conducted at the site to determine the existing noise levels. The measurements were made using a calibrated Larson-Davis Laboratories Model 700 (S.N. 2132) integrating sound level meter equipped with a ½-inch pre-polarized condenser microphone with pre-amplifier. When equipped with this microphone, the sound level meter meets the current American National Standards Institute standard for a Type 1 precision sound level meter. The sound level meter was positioned at a height of approximately five feet above the ground.

Two noise measurement locations were selected at the project site and are depicted as Site 1 and Site 2 on *Figure 3*. Site 1 is approximately 90 feet from the center line of Rancho Santa Fe Road. Site 2 is approximately 40 feet from the center line of La Costa Avenue. Concurrent traffic counts were conducted during the noise measurements.

The measured average noise level was 68 dB at Site 1 and 62 dB at Site 2. The measured noise levels and the concurrent traffic volumes are depicted in *Table 1*.

TABLE 1
MEASURED NOISE LEVELS AND TRAFFIC VOLUMES

Site	Description	Date Time	Leq ¹	Cars	MT ²	HT ³
1	90 feet to center line of Rancho Santa Fe Road	6/26/07 11:20 a.m. to 11:40 am	68 dB	563	12	8
2	40 feet to the center line of La Costa Avenue	1/16/08 12:10 p.m. to 12:30 pm	62 dB	86	2	0

Notes:

¹ Equivalent Continuous Sound Level (Average Sound Level)

² Medium Trucks

³ Heavy Trucks

3.0 FUTURE CONDITIONS

Noise associated with the project would most likely include loading dock and delivery activities, heating ventilation and air conditioning equipment as well as noise associated with the proposed amphitheater. Also, the project would generate traffic on adjacent roads such as Rancho Santa Fe Road and La Costa Avenue.

3.1 Loading Dock/Delivery Truck Activities

Eight loading dock areas are proposed. The loading docks would be located between Commercial Pads 1 and 2, 3 and 4, and at Commercial Pads 11, 15, 18, 19, 20 and 21. At any one location, the average sound level associated with loading dock noise is difficult to predict due to the many variables involved. These factors include the variations in truck engine power and idling times, the way loads are placed on hand trucks and fork lifts, and the number of operating minutes in any hour. However, to determine the approximate noise levels that would be generated at the loading dock area, noise measurements conducted at stores located in Vista and San Marcos were utilized. Based on these measurements, during the loading dock activities the one-hour average sound level is approximately 50 to 55 dB at 100 feet from the loading dock. The property lines of the closest residences would be located approximately 110 feet to the loading dock at Commercial Pad 15, 440 feet to Commercial Pad 18 and 320 feet to the loading dock at Commercial Pad 21.

Although the City's Municipal Code does not have a noise ordinance regulating this type of noise, this noise level may be annoying to some residents, particularly during the nighttime hours

at the proposed on-site multi-family units as well as the proposed residences located east of the loading dock areas.

3.2 Outdoor Gathering Area

A small outdoor gathering area is proposed to be located between the department store and supermarket. The gathering area would be used for events such as small summer jazz concerts and Christmas caroling (Spectrum Property Management 2003). Amplified speakers would not be used. The outdoor gathering area hours of operation would be the same as the store hours. Noise associated with the outdoor gathering area would primarily result when musical concerts/performances occur. Based on noise measurements that we have conducted for small non-amplified music events and Christmas caroling outdoors, the average noise levels vary from approximately 50 to 55 dB at a distance of 100 feet from the entertainers.

The closest residences would be located approximately 550 feet from the outdoor gathering area. At this distance, the outdoor activities would generate a one-hour average sound level of up to approximately 35 to 40 dB at the residences. The noise would result in a less than significant noise impact at the adjacent residences during the daytime and evening hours. These noise levels would comply with the City's Noise Element criteria, however, the activities could be annoying to some residents during the nighttime hours.

3.3 Heating Ventilation and Air Conditioning Equipment

Heating Ventilation and Air Conditioning (HVAC) equipment could be mounted on roofs or at the ground level of the commercial buildings. These units typically generate noise levels of approximately 45 to 55 dB at a distance of 50 feet. Future residences that would be located adjacent to proposed commercial buildings could be exposed to HVAC equipment noise. Thus, there is a potential for noise impacts associated with the HVAC units.

The planning and design of residential and commercial buildings should consider the potential HVAC noise. The noise should be designed, at a minimum, comply with the City's 60 dB CNEL exterior noise standard at adjacent residential properties.

3.4 Off-site Traffic Noise

The project would increase the traffic volume on several roads including Rancho Santa Fe Road and La Costa Avenue. As compared to the existing noise level, the existing plus project noise level would increase by three dB or less along most of the roads. A plus or minus one dB change is typically within the tolerance limit of traffic noise prediction models. In community noise

assessments a one dB increase is not noticeable to the human ear. A noise level increase of up to three dB is generally not considered significant. Typically, a three dB change in community noise is considered a just-noticeable difference. The noise level increase associated with the project is depicted in *Table 2*. The noise level would increase by four dB along La Costa Avenue between Rancho Santa Fe Road and the project's first driveway entrance. However, the only existing developed land use abutting this section of La Costa Avenue is commercial. The existing commercial use is not considered a sensitive land use. The noise level increase associated with the project-generated traffic is considered less than significant because the noise level increase would be three dB or less at adjacent noise sensitive areas.

TABLE 2
PROJECT RELATED OFF-SITE TRAFFIC NOISE LEVEL INCREASE
 (Existing and Existing With Project)

Location	Existing ADT	Existing CNEL at 50 feet from center line	Existing Plus Project ADT	Existing Plus Project CNEL at 50 feet from center line	Increase with Project (dB)
Rancho Santa Fe Road					
Melrose Dr. To San Elijo Rd.	34,675	77	40,289	77	<1
San Elijo Rd. to La Costa Avenue	39,950	77	48,625	78	1
La Costa Avenue to Olivenhain Rd.	32,200	76	36,793	77	1
Olivenhain Road					
El Camino Real to Rancho Santa Fe Rd.	42,600	78	45,662	78	<1
La Costa Avenue					
El Camino Real to Romeria Street	16,200	70	18,752	71	1
Romeria Street to Rancho Santa Fe Rd.	12,490	69	17,080	71	2
Rancho Santa Fe Rd. to Project Driveway 1	5,700	66	13,965	70	4
Project Driveway 1 to Calle Timiteo	5,600	66	11,215	69	3
Calle Timiteo to Camino de los Coches	3,500	64	8,365	67	3
East of Camino de los Coches	1,685	60	3,090	63	3
Calle Timiteo					
South of La Costa Avenue	2,098	57	3,629	60	3
North of Camino de los Coches	2,273	57	2,783	58	1

Notes: Traffic Source: Urban Systems Associates, 2007 and 2008

The near term (Year 2010) project-related noise increase is depicted in *Table 3*. According to the project's traffic consultant, the year 2010 traffic model assumes that several roads will be constructed in the area. The year 2010 traffic volumes are anticipated to be lower than the existing traffic volumes along some street segments. The near term (Year 2010) existing plus project plus cumulative projects would typically increase the noise level by three dB or less as indicated in *Table 3*. The noise level would increase by four dB along La Costa Avenue between Rancho Santa Fe Road and the project's first driveway entrance. However, as previously noted the only existing developed land use abutting this section of La Costa Avenue is non-noise sensitive commercial use. The noise level increase is considered less than significant.

TABLE 3
YEAR 2010 OFF-SITE TRAFFIC NOISE LEVEL INCREASE
(Year 2010 with Project)

Location	Year 2010 Plus Project ADT	Year 2010 Plus Project CNEL at 50 feet from center line	Increase with Project (dB)
Rancho Santa Fe Road			
Melrose Dr. To San Elijo Rd.	28,070	76	-1
San Elijo Rd. to La Costa Avenue	40,760	77	1
La Costa Avenue to Olivenhain Rd.	32,470	77	1
Olivenhain Road			
El Camino Real to Rancho Santa Fe Rd.	31,385	77	-1
La Costa Avenue			
El Camino Real to Romeria Street	18,500	71	1
Romeria Street to Rancho Santa Fe Rd.	16,600	70	1
Rancho Santa Fe Rd. to Project Driveway 1	14,000	70	4
Project Driveway 1 to Calle Timiteo	11,250	69	3
Calle Timiteo to Camino de los Coches	8,400	67	3
East of Camino de los Coches	3,100	63	3
Calle Timiteo			
South of La Costa Avenue	3,630	59	2
North of Camino de los Coches	2,810	58	1

Notes: Traffic Source: Urban Systems Associates, 2007
Cumulative Noise Level Increase or Decrease in 2010 Compared to the Existing Noise Level

3.5 Impacts on the Project

Exterior Noise

Rancho Santa Fe Road and La Costa Avenue would be the primary traffic noise sources at the site in the future. To determine future noise levels that could be experienced on-site, year 2030 traffic volumes were used. The year 2030 traffic volume along Rancho Santa Fe Road adjacent to the project site would range up to approximately 61,660 ADT (Urban Systems Associates 2008). The future traffic volume along La Costa Avenue adjacent to the project site would range from 3,105 ADT to 14,000 ADT (Urban Systems Associates 2008).

Lots 34 through 52 would be located adjacent to Rancho Santa Fe Road and approximately 7 to 40 feet below the grade elevation of the road. The lots would be shielded by the intervening topography resulting from the elevation difference. At the closest lots (i.e., Lots 34 through 52) adjacent to Rancho Santa Fe Road, the first floor noise level would exceed the City's noise criteria at several of the lots. The greatest noise level would occur at Lot 34. The future noise level would range up to approximately 65 dB CNEL and exceed the City's noise criteria by five dB at Lot 34. The noise level would decrease as the elevation differences between the road and the lots increases. At Lot 52 the noise level would be approximately 55 dB CNEL. This noise level would comply with the City's 60 dB CNEL exterior noise criteria. The SOUND32 noise modeling input/output is included as *Attachment 2*.

Lots 1, 9 and 10 would be located adjacent to La Costa Avenue. The future year 2030 traffic volume is projected to be approximately 3,105 ADT at this location (Urban System Associates 2008). The noise level at the back yards of these lots would be 60 dB CNEL or less. This noise level would comply with the City's noise guideline.

An outdoor gathering area would be generally located between the Commercial Pads 19, and 20. This area, as well as the employee eating areas located at the office buildings, would be exposed to future noise levels of 65 dB CNEL or less. The noise level at these areas would be less than significant.

Interior Noise

The City requires that interior noise levels at all residential dwellings not exceed a CNEL of 45 dB. Typically, with the windows open, and using standard California construction materials and methods, the building shells provide approximately 15 dB of noise reduction. Therefore, homes exposed to an exterior CNEL greater than 60 dB could result in an interior CNEL greater than 45

dB. The future noise level would exceed 60 dB CNEL at several of the lots adjacent to Rancho Santa Fe Road.

Interior noise levels at office uses, general and heavy commercial uses are not to exceed an hourly average noise level of 55 dB. The buildings would be situated at the bottom of a slope that would attenuate the traffic noise to less than 70 dB CNEL. Thus, the interior noise levels would be less than 55 dB CNEL.

4.0 MITIGATION

4.1 Project Generated Noise Impacts

Commercial Uses

When mechanical equipment plans are prepared, the plans shall be evaluated for the buildings on Commercial Pads 15 through 18 and 21 to ensure that outdoor mechanical equipment noise would not exceed 60 dB CNEL at the proposed adjacent residences.

To reduce the potential for annoyance associated with the loading dock noise at buildings on Commercial Pads 15, 18 and 21 minimum 12-foot high sound walls should be constructed along the loading dock areas at buildings on Commercial Pads 15, 18 and 21 as shown in *Figure 4*.

Outdoor Gathering Area

The outdoor gathering area shall not be used for events between the hours of 10:00 p.m. to 7:00 a.m.

4.2 Impacts on the Project

Proposed Residential Uses

The noise impact at the homes adjacent to Rancho Santa Fe Road could feasibly be mitigated by constructing a five to eight-foot high noise barrier at the top of slope along a portion of Rancho Santa Fe Road. The noise barrier locations and heights required to mitigate the future CNEL to 60 dB or less are depicted in *Figure 5*. The modeled CNEL noise levels at representative lots are depicted in *Table 4*.

TABLE 4
FUTURE TRAFFIC NOISE LEVEL AT REPRESENTATIVE LOTS

Receiver	Future CNEL (Without Barrier)	Future CNEL (With Barrier)
Lot 34	65	59
Lot 37	64	59
Lot 40	62	58
Lot 44	60	60
Lot 47	58	60
Lot 50	56	56
Lot 52	55	55

The materials used in the construction of the barrier are required to have a minimum surface density of 3.5 pounds per square foot. They may consist of masonry material, tempered glass or a combination of these materials. The barriers must be designed so there are no openings or cracks.

The mitigation measures are based on the tentative map. If changes are made to the proposed building pad elevations or lot setbacks as shown in these plans, a noise study will be required to determine whether the proposed barrier heights and locations will mitigate the noise level.

An interior noise study will be required for the homes on Lots 34 through 48 if two story homes are proposed on these lots. The interior acoustical analysis will be required prior to issuance of building permits for these residences to ensure that the interior CNEL would not exceed 45 dB.

This concludes our noise assessment. If you have any questions, please call me.

Very truly yours,



Mike Komula, Senior Acoustician

cc: Bob Ladwig, Ladwig Design Group

REFERENCES

California Department of Transportation (Caltrans), June 1983. *User's Instructions for SOUND32 (FHWA/CA-83/06)*.

California Department of Transportation (Caltrans), 1987. *California Vehicle Noise Emission Levels, (FHWA/CA/TL-87/03)*.

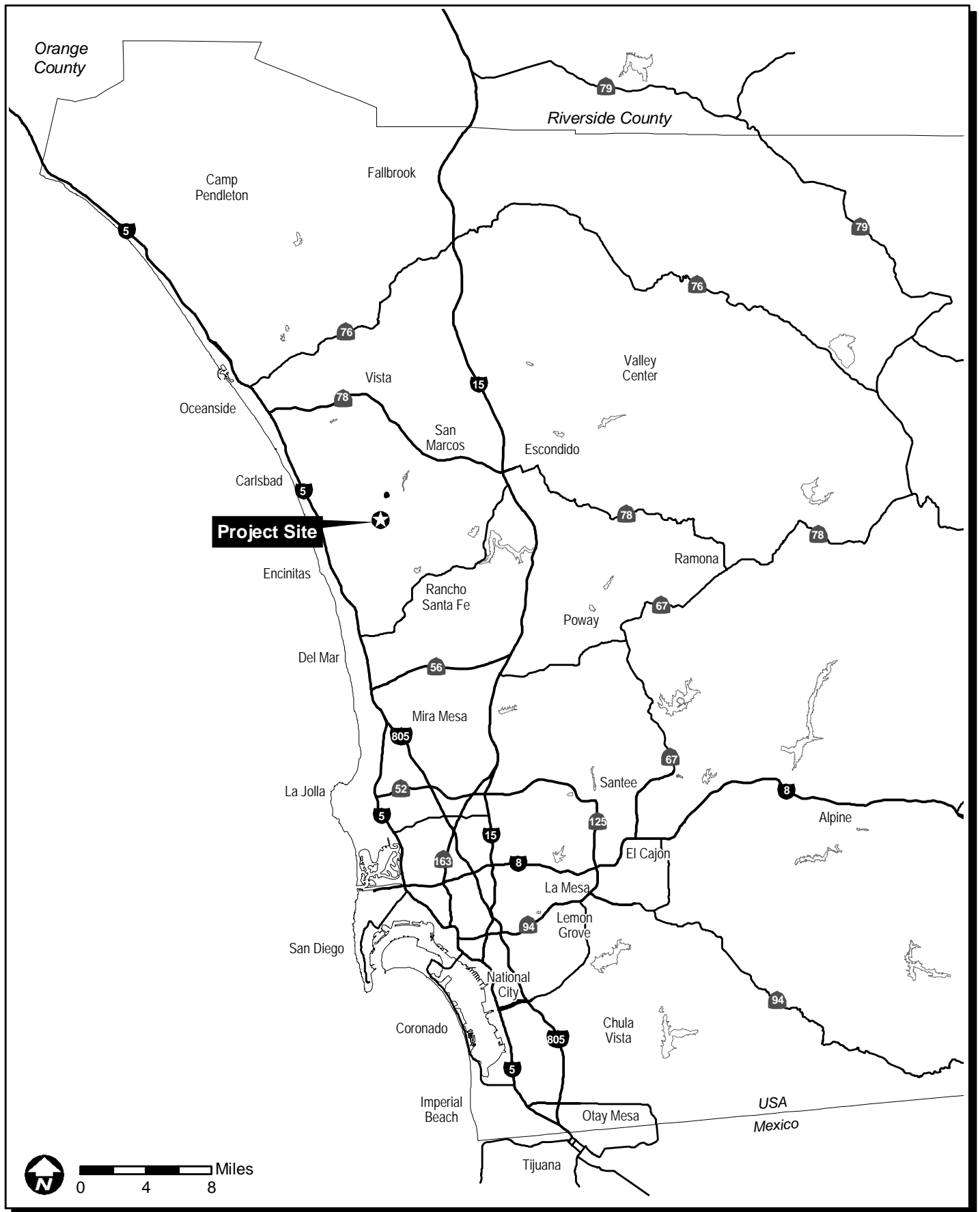
Carlsbad, City of, September, 1995. *City of Carlsbad Noise Guidelines Manual*.

Federal Highway Administration (FHWA), 1978. *FHWA Highway Traffic Noise Prediction Model (FHWA-RD.-77-108)*.

Spectrum Property Management, October 2003. *Telephone Conversation with Ms. Gretchen Early*.

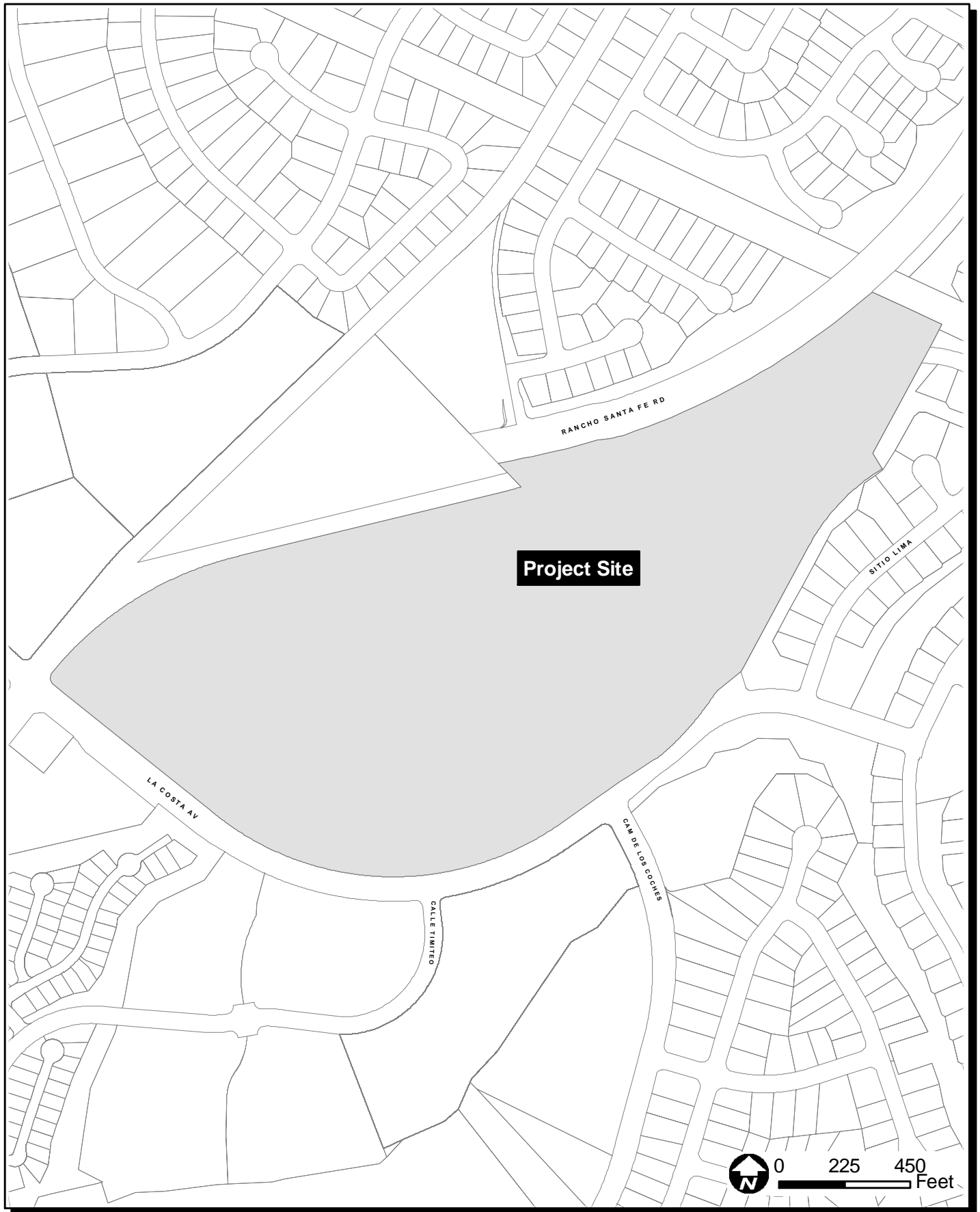
Urban Systems Associates, October 15, 2008. *Traffic Impact Analysis for La Costa Town Square*.

Urban Systems Associates, January 8 and May 16, 2008. *E-mail of Project Traffic Data Along La Costa Avenue from Mr. Sam Kab*.



La Costa Town Square - Environmental Noise Assessment
Regional Location

FIGURE
1



La Costa Town Square - Environmental Noise Assessment
Project Vicinity

FIGURE
2



SOURCE: O'Day Consultants, October 2008

La Costa Town Square - Environmental Noise Assessment
Noise Measurement Locations

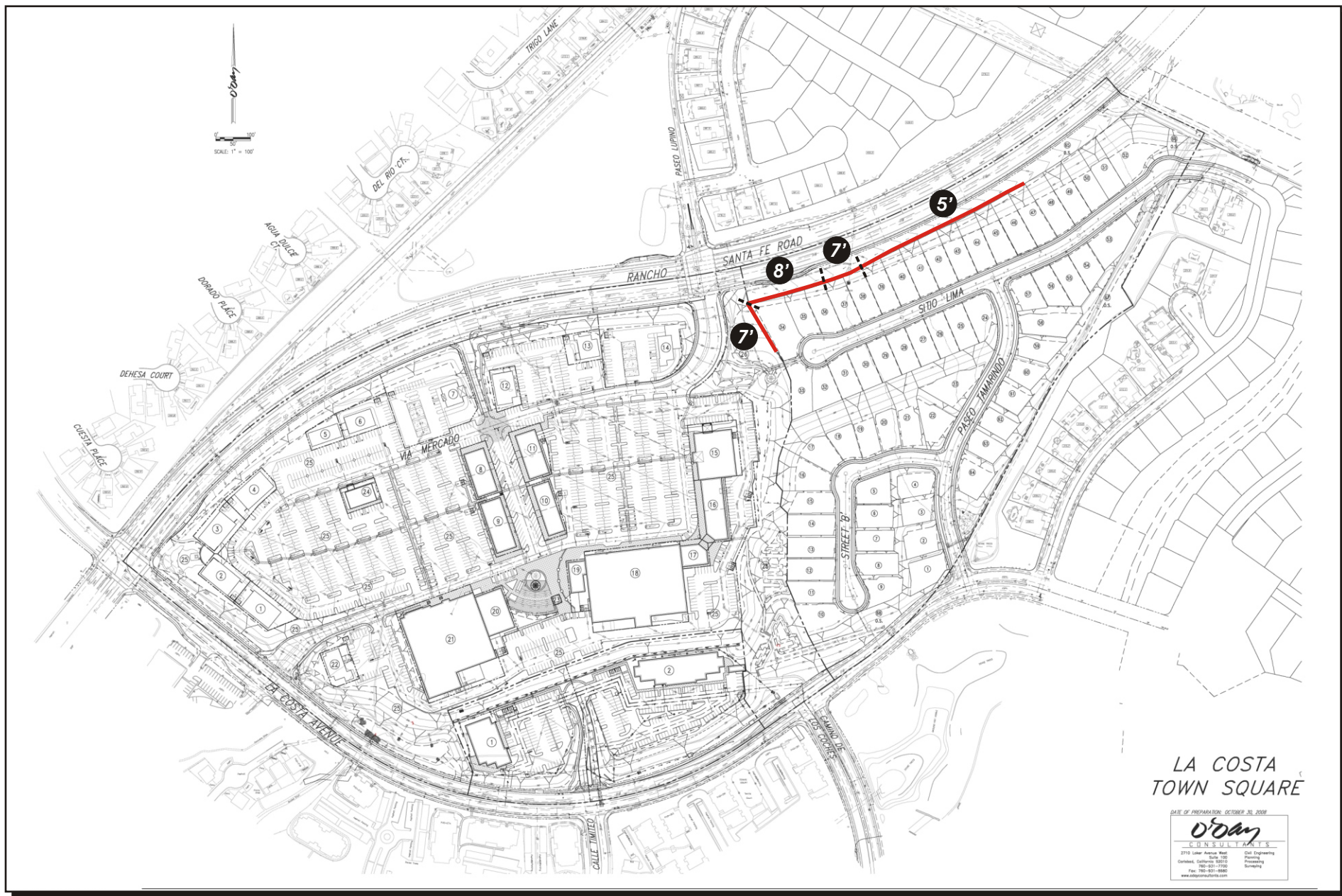
FIGURE
3



SOURCE: O'Day Consultants, October 2008

La Costa Town Square - Environmental Noise Assessment
Noise Barrier Heights & Locations

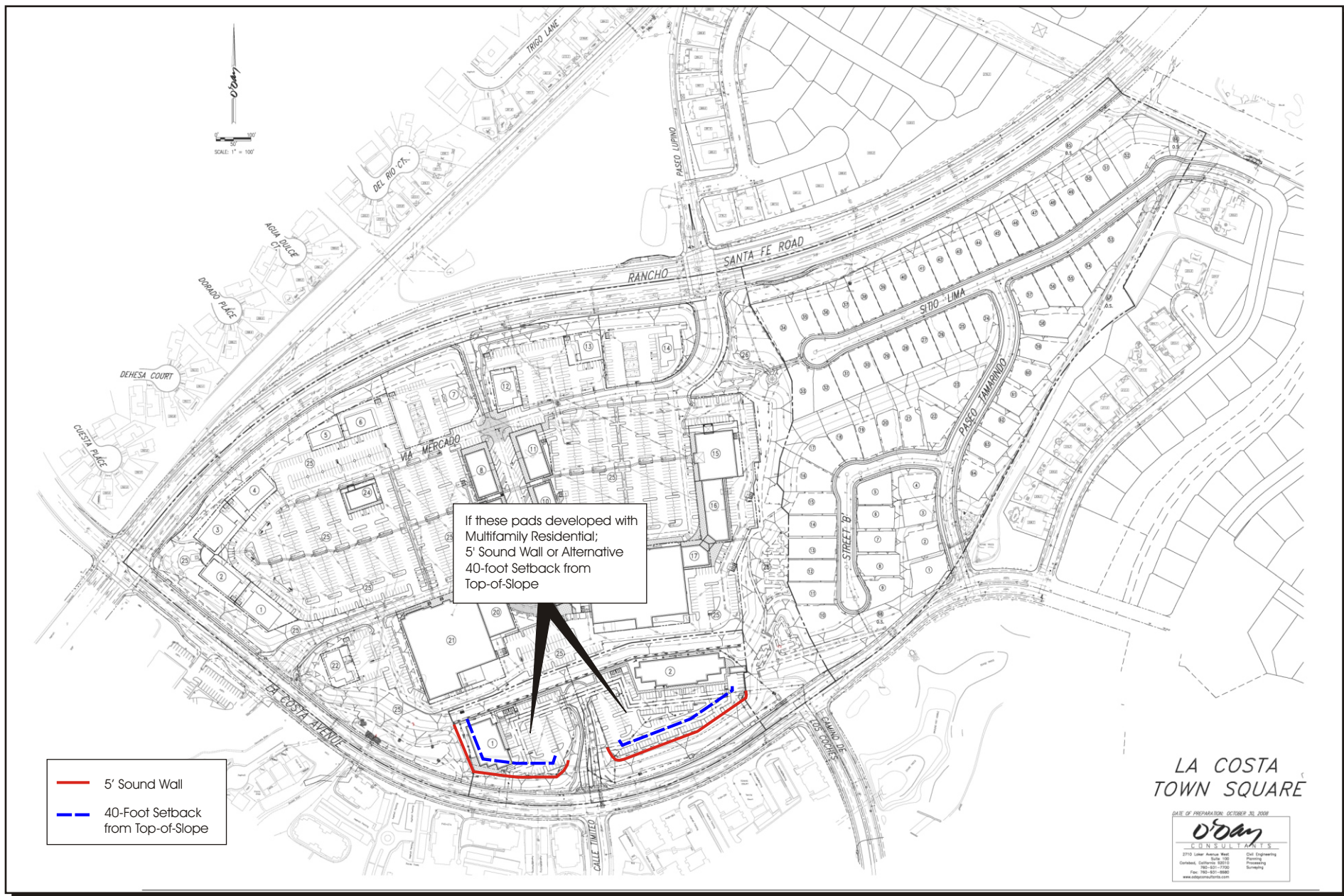
FIGURE
4



SOURCE: O'Day Consultants, October 2008

La Costa Town Square - Environmental Noise Assessment
Noise Barrier Heights & Locations

FIGURE
5



SOURCE: O'Day Consultants, October 2008

La Costa Town Square - Environmental Noise Assessment
Preliminary Noise Mitigation If Commercial Pads 25 or 26 are Multifamily Development

FIGURE
6

ATTACHMENT 1

DEFINITIONS

ATTACHMENT 1

DEFINITIONS

Term	Definition
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Community Equivalent Sound Level (CNEL)	CNEL is the A-weighted equivalent continuous sound exposure level for a 24-hour period with a ten dB adjustment added to sound levels occurring during the nighttime hours (10 pm to 7 am) and five dB added to the sound during the evening hours (7 pm to 10 pm).
Decibel, dB	A unit for measuring sound pressure level and is equal to 10 times the logarithm to the base 10 of the ratio of the measured sound pressure squared to a reference pressure, which is 20 micropascals.
Time-Average Sound Level, (TAV)	The sound level corresponding to a steady state sound level containing the same total energy as a time varying signal over a given sample period. TAV is designed to average all of the loud and quiet sound levels occurring over a time period.

ATTACHMENT 2

NOISE MODELING INPUT/OUTPUT

5618

Rancho Santa Fe Road--Calibrate (w/2 dB K factor)-5618.cal

T-Rancho Santa Fe Road, 1
845 , 55 , 18 , 55 , 12 , 55

T-Rancho Santa Fe Road, 2
845 , 55 , 18 , 55 , 12 , 55

L-Northbound, 1
N,-376.,235,363,N1
N,31.,296,377,N2
N,230.,351,385,N3
N,277.,367,387,N4
N,354.,394,390,N5
N,601.,501,400,N6
N,794.,610,408,N7
N,1004.,756,418,N8
N,1110.,839,423,N9
N,1410.,1162,441,N10

L-Southbound, 2
N,-384.,289,363,S1
N,19.,348,377,S2
N,214.,403,385,S3
N,259.,419,387,S4
N,335.,444,390,S5
N,577.,549,400,S6
N,766.,656,408,S7
N,972.,800,418,S8
N,1074.,879,423,S9
N,1370.,1198,441,S10

B-Top of Slope, 1 , 2 , 0 ,0
126.,100,373,373,B1
60.,215,380,380,B2
255.,269,384,384,B3
312.,288,386,386,B4
395.,330,390,390,B5
631.,441,400,400,B6
830.,547,410,410,B7
1050.,688,420,420,B8
1135.,750,420,420,B9
1215.,760,420,420,B10
1279.,730,410,410,B11

R, 1 , 67 ,500
365,321,400.,M1
K,-2
ALL,ALL
C,C

SOUND32

SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
 Rancho Santa Fe Road--Calibrate (w/2 dB K factor)-5618.cal

1

BARRIER DATA

BAR ELE	0	1	BARRIER HEIGHTS							BAR ID	LENGTH	TYPE
1	-	0.*								B1	132.8	
2	-	0.*								B2	202.4	
3	-	0.*								B3	60.1	
4	-	0.*								B4	93.1	
5	-	0.*								B5	261.0	
6	-	0.*								B6	225.7	
7	-	0.*								B7	261.5	
8	-	0.*								B8	105.2	
9	-	0.*								B9	80.6	
10	-	0.*								B10	71.4	
	0	1	2	3	4	5	6	7				

1

REC	REC ID	DNL	PEOPLE	LEQ(CAL)
1	M1	67.	500.	68.4

BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
 1 1 1 1 1 1 1 1 1 1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.

5618fut

Rancho Santa Fe Road--Future Year 2030 (63,400 ADT)-5618fut.FUT

T-Rancho Santa Fe Road, 1
3019 , 55 , 112 , 55 , 39 , 55

T-Rancho Santa Fe Road, 2
3019 , 55 , 112 , 55 , 39 , 55

L-Northbound, 1
N,-376.,235,363,N1
N,31.,296,377,N2
N,230.,351,385,N3
N,277.,367,387,N4
N,354.,394,390,N5
N,601.,501,400,N6
N,794.,610,408,N7
N,1004.,756,418,N8
N,1110.,839,423,N9
N,1410.,1162,441,N10

L-Southbound, 2
N,-384.,289,363,S1
N,19.,348,377,S2
N,214.,403,385,S3
N,259.,419,387,S4
N,335.,444,390,S5
N,577.,549,400,S6
N,766.,656,408,S7
N,972.,800,418,S8
N,1074.,879,423,S9
N,1370.,1198,441,S10

B-Top of Slope, 1 , 2 , 0 , 0
126.,100,373,373,B1
60.,215,380,380,B2
255.,269,384,384,B3
312.,288,386,386,B4
395.,330,390,390,B5
631.,441,400,400,B6
830.,547,410,410,B7
1050.,688,420,420,B8
1135.,750,420,420,B9
1215.,760,420,420,B10
1279.,730,410,410,B11

R, 1 , 67 , 500
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R, 2 , 67 , 500
150,170,378.,34-B
R, 3 , 67 , 500
325,260,379.,37-A
R, 4 , 67 , 500
333,230,379.,37-B
R, 5 , 67 , 500
486,325,381.,40-A
R, 6 , 67 , 500
495,305,381.,40-B
R, 7 , 67 , 500
705,420,383.,44-A
R, 8 , 67 , 500
725,390,383.,44-B
R, 9 , 67 , 500
865,490,386.,47-A
R, 10 , 67 , 500
885,463,386.,47-B
R, 11 , 67 , 500
1025,585,388.,50-A
R, 12 , 67 , 500
1040,562,388.,50-B

5618fut

R, 13 , 67 ,500
1170,668,386.5,52-A
R, 14 , 67 ,500
1180,648,386.5,52-B
R, 15 , 67 ,500
365,321,400.,M1
K,-2
ALL,ALL
C,C

SOUND32

SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
 Rancho Santa Fe Road--Future Year 2030 (63,400 ADT)-5618fut.FUT

1

BARRIER DATA

BAR ELE	0	1	BARRIER HEIGHTS							BAR ID	LENGTH	TYPE
1	-	0.*								B1	132.8	
2	-	0.*								B2	202.4	
3	-	0.*								B3	60.1	
4	-	0.*								B4	93.1	
5	-	0.*								B5	261.0	
6	-	0.*								B6	225.7	
7	-	0.*								B7	261.5	
8	-	0.*								B8	105.2	
9	-	0.*								B9	80.6	
10	-	0.*								B10	71.4	
	0	1	2	3	4	5	6	7				

1

REC	REC ID	DNL	PEOPLE	LEQ(CAL)
1	34-A	67.	500.	65.0
2	34-B	67.	500.	65.1
3	37-A	67.	500.	63.3
4	37-B	67.	500.	64.3
5	40-A	67.	500.	61.3
6	40-B	67.	500.	62.4
7	44-A	67.	500.	58.2
8	44-B	67.	500.	59.8
9	47-A	67.	500.	57.0
10	47-B	67.	500.	58.2
11	50-A	67.	500.	55.2
12	50-B	67.	500.	56.4
13	52-A	67.	500.	53.8
14	52-B	67.	500.	54.5
15	M1	67.	500.	74.1

BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION

1 1 1 1 1 1 1 1 1 1

CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION

0. 0. 0. 0. 0. 0. 0. 0. 0. 0.

5618

Rancho Santa Fe Road--Future Year 2030 (63,400 ADT)-5618.mit

T-Rancho Santa Fe Road, 1
 3019 , 55 , 112 , 55 , 39 , 55

T-Rancho Santa Fe Road, 2
 3019 , 55 , 112 , 55 , 39 , 55

L-Northbound, 1
 N,-376.,235,363,N1
 N,31.,296,377,N2
 N,230.,351,385,N3
 N,277.,367,387,N4
 N,354.,394,390,N5
 N,601.,501,400,N6
 N,794.,610,408,N7
 N,1004.,756,418,N8
 N,1110.,839,423,N9
 N,1410.,1162,441,N10

L-Southbound, 2
 N,-384.,289,363,S1
 N,19.,348,377,S2
 N,214.,403,385,S3
 N,259.,419,387,S4
 N,335.,444,390,S5
 N,577.,549,400,S6
 N,766.,656,408,S7
 N,972.,800,418,S8
 N,1074.,879,423,S9
 N,1370.,1198,441,S10

B-Top of Slope, 1 , 2 , 0 , 0
 126.,100,373,380,B1
 60.,215,380,388,B2
 255.,269,384,392,B3
 312.,288,386,393,B4
 395.,330,390,395,B5
 631.,441,400,405,B6
 830.,547,410,410,B7
 1050.,688,420,420,B8
 1135.,750,420,420,B9
 1215.,760,420,420,B10
 1279.,730,410,410,B11

R, 1 , 67 , 500
 140,219,378.,34-A
 R, 2 , 67 , 500
 150,170,378.,34-B
 R, 3 , 67 , 500
 325,260,379.,37-A
 R, 4 , 67 , 500
 333,230,379.,37-B
 R, 5 , 67 , 500
 486,325,381.,40-A
 R, 6 , 67 , 500
 495,305,381.,40-B
 R, 7 , 67 , 500
 705,420,383.,44-A
 R, 8 , 67 , 500
 725,390,383.,44-B
 R, 9 , 67 , 500
 865,490,386.,47-A
 R, 10 , 67 , 500
 885,463,386.,47-B
 R, 11 , 67 , 500
 1025,585,388.,50-A
 R, 12 , 67 , 500
 1040,562,388.,50-B

5618

R, 13 , 67 ,500
1170,668,386.5,52-A
R, 14 , 67 ,500
1180,648,386.5,52-B
R, 15 , 67 ,500
365,321,400.,M1
K,-2
ALL,ALL
C,C

SOUND32

SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
Rancho Santa Fe Road--Future Year 2030 (63,400 ADT)-5618.mit

1

BARRIER DATA

BAR ELE	0	1	BARRIER HEIGHTS							BAR ID	LENGTH	TYPE
1	-	8.*								B1	132.8	
2	-	8.*								B2	202.4	
3	-	8.*								B3	60.1	
4	-	6.*								B4	93.0	
5	-	5.*								B5	261.0	
6	-	3.*								B6	225.5	
7	-	0.*								B7	261.5	
8	-	0.*								B8	105.2	
9	-	0.*								B9	80.6	
10	-	0.*								B10	71.4	
	0	1	2	3	4	5	6	7				

1

REC	REC ID	DNL	PEOPLE	LEQ(CAL)
1	34-A	67.	500.	56.4
2	34-B	67.	500.	59.4
3	37-A	67.	500.	57.6
4	37-B	67.	500.	59.1
5	40-A	67.	500.	57.4
6	40-B	67.	500.	58.4
7	44-A	67.	500.	56.1
8	44-B	67.	500.	57.5
9	47-A	67.	500.	56.4
10	47-B	67.	500.	57.4
11	50-A	67.	500.	55.2
12	50-B	67.	500.	56.2
13	52-A	67.	500.	53.8
14	52-B	67.	500.	54.5
15	M1	67.	500.	74.1

BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION

1 1 1 1 1 1 1 1 1 1

CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION

8. 8. 8. 6. 5. 3. 0. 0. 0. 0.

May 14, 2008

J.N. 5618-02

Mr. Pat O'Day
O'Day Consultants
2710 Loker Avenue West, Suite 100
Carlsbad, CA 92008

PROJECT: *La Costa Town Square--Carlsbad, CA*
RE: *Rock Crushing and Blasting Noise and Vibration Assessment*

Dear Mr. O'Day:

Rock crushing and blasting is anticipated to occur at the La Costa Town Square site as part of the construction activities. This assessment evaluates the noise and vibration impacts associated with the rock crushing facility and blasting. It should be noted that other than rock crushing and blasting, no other construction activity at the project site such as pile driving or other major construction activity, is anticipated to generate vibration levels that could potentially result in significant vibration impacts at existing adjacent residences.

1.0 Rock Crushing

Approximately 127,000 cubic yards of rock material is anticipated to be excavated within the granitic rock formation at the La Costa Town Center site (O'Day Consulting 2008). The hours of operation for the rock crusher would be from 7:00 a.m. to 5:00 p.m. Monday through Friday and 8:00 a.m. to 5:00 p.m. on Saturday. The rock crushing operation is expected to take approximately five months (Ladwig Design Group 2008). A portable rock crusher would be used at the site during these construction activities. The rock crushing operation would begin with a front loader picking up material and dumping the material into a primary crusher. The material would be then crushed, screened and stacked in product piles. The material would be stockpiled adjacent to the rock crushing equipment. All material will be used onsite. Electric power would most likely be provided by a diesel engine generator. The closest homes would be located approximately 850 feet from the rock crushing facility (*Figure 1*).

Based on noise measurements that have been conducted for portable rock crushing operations, the rock crushing activity would generate a one-hour average noise level of approximately 86 dBA at a distance of 50 feet from the primary crusher. The City of Carlsbad considers a

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Rock Crushing and Blasting Noise and Vibration Assessment

Community Noise Equivalent Level (CNEL) of 60 dBA to be compatible with residential development (City of Carlsbad, September 1995. *City of Carlsbad Noise Guidelines Manual*). Assuming the rock crusher is operated during the daytime hours for a period of ten-hours each day, the CNEL would be approximately 82 dBA at 50 feet. The rock crusher noise would attenuate at a rate of approximately six dB per doubling of distance due to geometric spreading of the sound waves (i.e., the noise level would be 76 dBA CNEL at 100 feet, 64 dBA CNEL at 400 feet). Thus, the noise level would be approximately 57 dBA CNEL at 850 feet assuming worst-case that there is a direct line-of-sight from the facility to the closest residents. This noise level would comply with the City's 60 dBA CNEL noise criteria. Thus, the noise impact associated with the rock crushing facility is considered less than significant.

Because of the distance from the rock crusher to the closest existing residences (i.e., 850 or more feet), the vibration from the rock crusher would be well below levels that could adversely affect structures or humans and would not be noticeable to the existing residents.

2.0 Blasting

Blasting may be required during construction if rock encountered during grading cannot be ripped by bulldozers. The extent of the potential blasting area is indicated in *Figure 2*. As shown in the figure, the blasting area includes an off-site area located northeast of the site near the northern terminus of Sitio Lima. Blasting would occur for approximately 60 working days.

The City does not have specific vibration criteria for blasting. The United States Bureau of Mines (USBM) has provided an impact guide in the area of structural to vibration (1980 USBM RI 8507, "*Structure Response and Damage Produced by Ground Vibration From Surface Mine Blasting*"). The criteria are well accepted for all types of ground vibration and are based on the peak particle velocity of the receiving structure. The potential for damage to residential structures is greater with low-frequency blast vibration (below 40 Hz) than with high frequency blast vibration (40 Hz and above). For low-frequency blast vibration, a limit of 0.75 inches per second (in/sec) peak particle velocity (PPV) is recognized for modern drywall construction. For frequencies above 40 Hz, a limit of 2.0 in/sec PPV for all types of construction was proposed.

2.1 Noise From Blasting and Drilling

Construction blasting noise will vary but generally generates a maximum noise level of approximately 94 dBA at a distance of 50 feet (BBN 1989). The blast is generally perceived as a dull thud, rather than as a loud explosion. The closest existing residence to the blasting area would be a home located approximately 30 feet away at Sitio Lima. The remaining existing

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Rock Crushing and Blasting Noise and Vibration Assessment

homes would be located approximately 150 or more feet from the blasting area. Assuming blasting activities are conducted adjacent to the closest residence; the maximum noise level could range up to approximately 100 dBA. This noise level would occur for one or two seconds per blast, and would be great enough to potentially startle and annoy the adjacent occupants. The maximum noise level at the remaining nearby existing residences would range up to approximately 84 dBA. This noise level would be perceptible to people, but because of the infrequent nature of blasting and by limiting the activities to the City's allowable hours for construction and grading activities (i.e., 7:00 a.m. to sunset, Monday through Friday, and between 8:00 a.m. and sunset on Saturday) the noise impact would be less than significant.

Drilling would be necessary to bore holes for the blasting materials. Rock drills generate air-borne noise levels of approximately 80 to 98 dB at a distance of 50 feet. Typically, drilling holes for a blasting pattern can last from several hours to several days. The period of time to drill per blast depends on several factors including the number of holes, the depth of the holes and the effort required to drill through the rock. Assuming drilling and blasting activities are conducted off-site adjacent to the closest home, the maximum noise level could range up to approximately 100 dBA at the closest home. This noise level would result in a significant noise impact if not mitigated. The remaining existing residences in the area would be at least 150 or more feet from the blasting area. When the drilling equipment is operating, these existing residences could be disturbed by the drilling activities. The drilling activities are expected to comply with the permitted hours of operation and because of the short-term duration of the drilling operation, the impact would be less than significant at these residences.

2.2 *Vibration from Blasting*

Vibration levels associated with blasting would vary. Ground-borne vibration is influenced in part by the soil conditions and the receiving building. Blasting operations at the site would be in general conformance with the blasting specifications prepared by the U. S. Bureau of Mines. Blast contractors can control vibration by limiting the charge weight per sequential delay. Smaller blasting charges would be used in areas that are closer to existing homes. As previously indicated, the closest residence to a blasting area would be approximately 30 feet away. There is insufficient information available at this time to perform specific calculations of the ground-borne vibration from the blasting. However, using preliminary screening calculations and assuming a distance of 30 feet from the blast area indicate the vibration from blasting could exceed the 2.0 inches per second PPV threshold. Thus, blasting could potentially result in a significant vibration impact at the adjacent residence.

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2.3 Blasting and Drilling Mitigation

Blasting operations, if necessary, should be in general conformance with the blasting specifications prepared by the U. S. Bureau of Mines. The blasting contractor would be required to limit the blasting intensities so as to prevent damage to all existing structures, and in no case would intensities exceed the safety standard of particle velocity recommended by the U.S. Bureau of Mines.

All structures in the vicinity of the blasting area not listed above such as water towers, pipelines and other utilities etc., shall be protected from damage by the blaster on a case-by-case basis.

All property owners within 250 feet of the blasting area shall be notified of the blasting activities. This notification shall describe expected period and frequency that the blasting shall occur and give a contact phone number for any questions or complaints. All complaints shall be responded to in a method deemed satisfactory to the City of Carlsbad Director of Planning.

During off-site rock drilling, the construction contractor shall implement a portable sound attenuation barrier with a Sound Transmission Class rating of 15 or more along the northern portion of the project site. The sound attenuation barrier shall break the line-of-sight between the rock drill and the first-floor level of the single-family residence at the northern terminus of Sitio Lima adjacent to the project site. The sound attenuation barrier shall remain in place as long as rock drilling activity is occurring off-site adjacent to the existing single-family residence. This would reduce construction noise levels by at least five dBA at this residence. In addition, prior to initial drilling operations, the rock drill shall be certified to not generate noise levels in excess of 85 dBA at a distance of 50 feet while operated at high idle (maximum governed rpm) under full-load condition during the test.

This concludes our noise assessment. If you have any questions, please call me.

Sincerely,



Mike J. Komula

Acoustician

cc: Mr. Bob Ladwig, Ladwig Design Group



ROCK CRUSHING AREA



CRUSHED ROCK STOCKPILE AREA

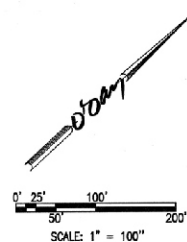


1" = 400'

SOURCE: O'Day Consulting, 1/26/2005

La Costa Town Square - Rock Crushing and Blasting Noise and Vibration Assessment
Rock Crushing Facility

FIGURE
1



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NOTE!!
ELECTRONIC DATA FILES ARE FOR REFERENCE
ONLY AND ARE NOT TO BE USED FOR HORIZONTAL
OR VERTICAL SURVEY CONTROL

BENCHMARK:

DESCRIPTION: K-302, A STANDARD DISK STAMPED K 302 1935
IN THE TOP OF A CONCRETE POST
LOCATION: 8.5' EASTERLY OF EASTERN BERM LINE OF RANCHO
SANTA FE RD., AND APPROXIMATELY 1.2 MILES
NORTHERLY OF THE INTERSECTION OF RANCHO
SANTA FE ROAD AND LA COSTA AVE.
RECORD FROM: COUNTY BENCH LEVELS (NO. COUNTY VERT.
CONTROL DATA)
ELEVATION: 533.39 DATUM: MVD OF 1929



LIMITS OF BLASTING

O'Day CONSULTANTS	
2710 Laker Avenue West Suite 100 Carlsbad, California 92008 760-831-7900 Fax: 760-831-9850	Civil Engineering Planning Processing Surveying
DESIGNED BY: K.D. DATE: OCTOBER 2003	DRAWN BY: J.S., C.F. SCALE: 1" = 100'
PROJECT MGR.: G.O. JOB NO.: 00-1017	ENGINEER OF WORK:
	DATE: RCE: 32014

La Costa Town Square - Rock Crushing and Blasting Noise and Vibration Assessment
Potential Blasting Area

FIGURE
2

